Part 1

Review Homework 8.0

`ARoC6.tex`

Exercise 1 *Let* $f(x) = \dfrac{1}{x^2}$.

(a) *Compute* $AV_{[2,4]}$.

$AV_{[2,4]} = \boxed{-\dfrac{3}{16}}$.

(b) *Compute* $AV_{[100,101]}$.

$AV_{[100,101]} = \boxed{-\dfrac{201}{102010000}}$.

`ARoC7.tex`

Exercise 2 *Let* $f(x) = x^4$.

(a) *Compute* $AV_{[1,3]}$.

$AV_{[1,3]} = \boxed{80}$.

`BNF1.tex`

Exercise 3 *Let* f *be a function defined by* $f(x) = 2x^2$ *and* g *be a function defined by* $g(x) = 5 - 3x$. *Use the pair of functions* f *and* g *to find the following values, if they exist. If the value does not exist, enter DNE.*

(a) $(f+g)(2) = \boxed{7}$

(b) $(f-g)(-1) = \boxed{-6}$

(c) $(g-f)(1) = \boxed{0}$

(d) $(f \cdot g)\left(\dfrac{1}{2}\right) = \boxed{\dfrac{7}{4}}$

(e) $\left(\dfrac{f}{g}\right)(0) = \boxed{0}$

(f) $\left(\dfrac{g}{f}\right)(-2) = \boxed{\dfrac{11}{8}}$

CoF8.tex

Use the given pair of functions to find and simplify expressions for the following functions and state the domain of each using interval notation.

Exercise 4 *For* $f(x) = 3x^2 - 2x + 7$ *and* $g(x) = -x + 3$

- $(g \circ f)(x) = \boxed{-3x^2 + 2x - 4}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$
- $(f \circ g)(x) = \boxed{3x^2 - 20x + 28}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$
- $(f \circ f)(x) = \boxed{27x^4 - 36x^3 + 132x^2 - 74x + 140}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$

Exercise 5 *For* $f(x) = x^2 - 9$ *and* $g(x) = |x|$

- $(g \circ f)(x) = \boxed{|x^2 - 9|}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$
- $(f \circ g)(x) = \boxed{x^2 - 9}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$
- $(f \circ f)(x) = \boxed{x^4 - 18x^2 + 72}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$

Exercise 6 *For* $f(x) = 4x + 3$ *and* $g(x) = -\sqrt{x}$

- $(g \circ f)(x) = \boxed{-\sqrt{4x + 3}}$ *with domain* $\left[\boxed{-\frac{3}{4}}, \boxed{\infty}\right)$
- $(f \circ g)(x) = \boxed{-4\sqrt{x} + 3}$ *with domain* $\left[\boxed{0}, \boxed{\infty}\right)$
- $(f \circ f)(x) = \boxed{16x + 15}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$

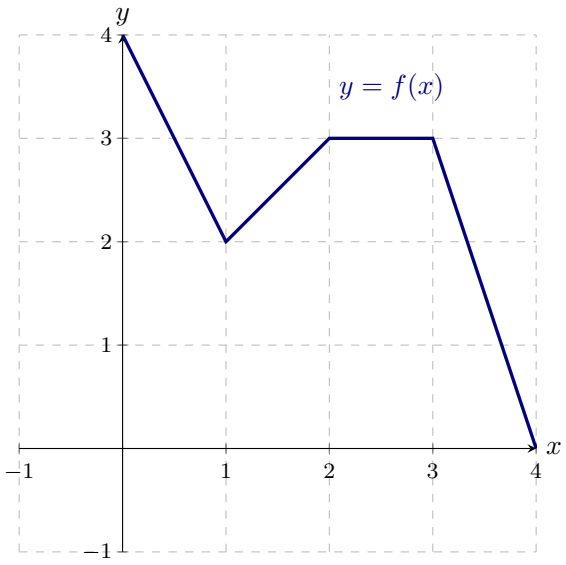
Exercise 7 *For* $f(x) = |x|$ *and* $g(x) = \sqrt{9 - x}$

- $(g \circ f)(x) = \boxed{\sqrt{9 - |x|}}$ *with domain* $\left[\boxed{-9}, \boxed{9}\right]$

- $(f \circ g)(x) = \boxed{|\sqrt{9-x}|}$ *with domain* $\left(\boxed{-\infty}, \boxed{9}\right]$
- $(f \circ f)(x) = \boxed{|x|}$ *with domain* $\left(\boxed{-\infty}, \boxed{\infty}\right)$

`D3.tex`

Exercise 8 *Use the graph of $y = f(x)$ and the table for $g(x)$ below to find the requested function values.*



x	$g(x)$
0	0
1	3
2	3
3	0
4	4

$$(f+g)(2) = \boxed{6}$$

$$(g-f)(1) = \boxed{1}$$

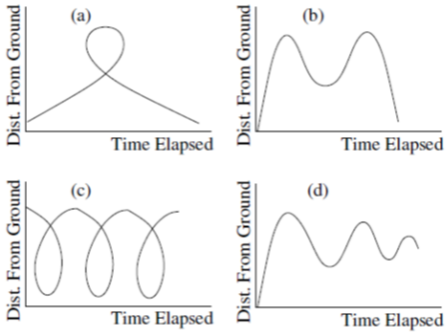
$$\left(\frac{f}{g}\right)(2) = \boxed{1}$$

$$\left(\frac{g}{f}\right)(3) = \boxed{0}$$

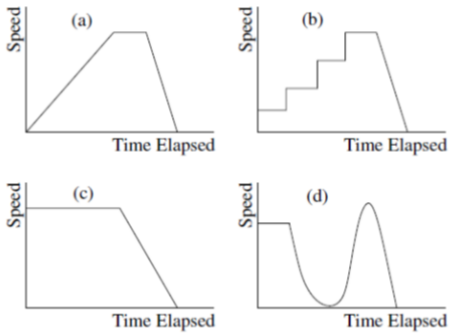
`CiT2.tex`

Exercise 9 *For each of the situations below, pick the graph that most reasonably reflects the situation and the variables involved.*

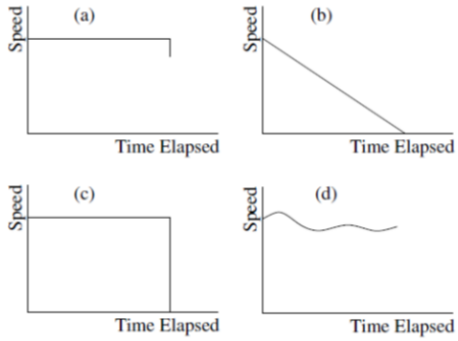
(a) *A girl takes a ride on a Ferris wheel.* $\boxed{B}$



(b) *A child climbs up to the top of a slide and then slides down it:* $\boxed{D}$



(c) *A bus drives into the bus station and drops off its passengers:* $\boxed{B}$



`EF6.tex`

Exercise 10 *A population has* 5000 *people at time* $t = 0$*, where* t *is measured in years.*

Exercise 10.1 *If the population increases by* 200 *people by year, the population* $P(t)$ *after* t *years equals* $P(t) = \boxed{5000 + 200t}$.

Exercise 10.2 *If the population increases by* 7% *by year, the population* $P(t)$ *after* t *years equals* $P(t) = \boxed{5000(1.07)^t}$.

EM13.tex

Exercise 11 *Let's say the cost of renting a scooter is as follows:* \$1 *to unlock the scooter, and then* \$0.20 *for each minute you have travelled. Fill the following table with prices in terms of time:*

minutes	*Price*
0	\$1
5	\$ 2
10	\$ 3
15	\$ 4
20	\$ 5

Exercise 11.1 *What does seem more adequate to model this situation?*

Multiple Choice:

(a) *A linear function* ✓

(b) *An exponential function*

Exercise 11.1.1 *Find a linear formula for the fare f paid in terms of the amount m of miles travelled. Answer:* $f(m) = \boxed{0.2}\,m + \boxed{1}$.

FP1.tex

Exercise 12 *Let f be a function defined as follows.*

$$f(x) = \begin{cases} -x, & x < 0 \\ x^2, & x \geq 0 \end{cases}$$

Exercise 12.1 (a) *Compute $f(1)$.*

$f(1) = \boxed{1}$

(b) *Compute $f(-1)$.*

$f(-1) = \boxed{-1}$

(c) *The calculations in parts (a) and (b) above show that f is*

Multiple Choice:

(i) *neither even nor odd.*
(ii) *even but not odd.*
(iii) *odd but not even.*
(iv) *both even and odd.*
(v) *not odd, but f may not be even.*
(vi) *not even, but f may not be odd.* ✓

Exercise 12.2 (a) *Compute $f(3)$.*

$f(3) = \boxed{9}$

(b) *Compute $f(-3)$.*

$f(-3) = \boxed{3}$

(c) *The calculations in parts (a) and (b) above show that f is*

Multiple Choice:

(i) *neither even nor odd.* ✓
(ii) *even, but not odd.*
(iii) *odd, but not even.*
(iv) *both even and odd.*
(v) *The calculations do not say anything about whether f is even or odd.*

`LE5.tex`

Exercise 13 *A particular car is known to have a fuel efficiency of 23 miles/-gallon (mpg).*

(a) *If this car is driven 23 miles, it uses* $\boxed{1}$ *gallons of fuel.*

(b) *If this car is driven 115 miles, it uses* $\boxed{5}$ *gallons of fuel.*

(c) *Call x the number of miles driven and y the gallons of fuel used. Then x and y have a linear relationship.*

(i) *The slope of this linear relationship is* $\boxed{1/23}$ *gallons/mile.*

(ii) *The equation of this line in slope-intercept form is given by* $y = \boxed{(1/23) * x + 0}$.

LM5.tex

Exercise 14 *A shoe salesperson is paid \$250 per week plus 3% commission on her weekly sales of x dollars.*

(a) *A linear function that represents her total weekly pay, W (in dollars) in terms of x is* $W(x) = \boxed{.03x + 250}$.

(b) *In order for her to earn \$445 for the week, her weekly sales must be* $\$\boxed{6500}$.

(c) *The drapery department at her store has an open sales position that only pays \$200 per week, but pays out 5% commission on sales. What is the minimum amount of sales she would have to sell in a week to make more money at the drapery sales job than the shoe sales job?* $\$\boxed{2500}$

LOG2.tex

Exercise 15 *Which of the following equations or statements are equivalent to* $log_5 7 = x$

Select All Correct Answers:

(a) *5 to what power is 7?* ✓

(b) $7^x = 5$

(c) *7 to what power is 5?*

(d) $5^x = 7$ ✓

(e) $5^7 = x$

(f) $\log 5^x = \log 7$ ✓

(g) $log_7 5 = x$

LOG5.tex

Exercise 16 *Evaluate the following logarithmic expressions.*

$\log_b b^{\frac{7}{9}} = \boxed{\frac{7}{9}}$

$\log_{b^3} b^{\frac{3}{4}} = \boxed{\frac{1}{4}}$

$\log_{b^{\frac{2}{3}}} b^{\frac{8}{3}} = \boxed{4}$

POLY2.tex

Exercise 17 *For* $g(x) = \frac{1}{2}(x+2)^2 - 7$*, determine the following properties:*

Exercise 17.1 *Does the graph open upwards or downwards?*

Multiple Choice:

(a) *upward* ✓

(b) *downward*

Exercise 17.2 *Identify the vertex:*

$(\boxed{-2}, \boxed{-7})$

Exercise 17.3 *Determine the x-intercepts*

smaller x-intercept $(\boxed{-2-\sqrt{14}}, 0)$ *larger x intercept* $(\boxed{-2+\sqrt{14}}, 0)$

Exercise 17.4 *Determine the y-intercepts*

$(0, \boxed{-5})$

Exercise 17.5 *Determine the maximum or minimum value of the function.*

Multiple Choice:

(a) *maximum*

(b) *minimum* ✓

Max or Min Value: $\boxed{-7}$

`R1.tex`

In each part, an invertible function f will be defined. For each function, find its inverse.

Exercise 18 $f(x) = 4x - 7$

$$f^{-1}(x) = \boxed{\frac{x+7}{4}}$$

Exercise 19 $f(x) = \dfrac{x+2}{9} - 1$

$$f^{-1}(x) = \boxed{9(x+1) - 2}$$

Exercise 20 $f(x) = \sqrt[3]{x+4} - 7$

$$f^{-1}(x) = \boxed{(x+7)^3 - 4}$$

`ZoF10.tex`

Exercise 21 *Feel free to use Desmos or another graphing calculator for the following problems.*

(a) *Let f be a function defined by $f(x) = e^x - 1$.*
The function f has $\boxed{1}$ *zero(s).*

(b) *Let g be a function defined by $g(x) = e^x + 1$.*
The function g has $\boxed{0}$ *zero(s).*

(c) *Let h be a function defined by $h(x) = x^3 - 4x^2 + x - 6$.*
The function g has $\boxed{3}$ *zero(s).*

`ZoFF4.tex`

Exercise 22 *The following is a rational function.*

$$g(x) = \frac{1}{x+5} + \frac{1}{x-5} + \frac{x^2-35}{x^2-25}.$$

How many zeros does this function have? $\boxed{1}$

Exercise 22.1 *It is at* $x = \boxed{-7}$.

Exercise 22.1.1 *Why is $x = 5$ NOT a zero of g?*

Multiple Choice:

(a) *Because $g(5)$ is a nonzero number.*

(b) *Because $g(5) = 0$.*

(c) *Because $x = 5$ is not in the domain of g.* ✓

Hint: *Make sure to check your possible solutions are actually solutions.*

Exercise 23 *The following is a rational function.*

$$h(x) = 1 - \frac{x^2 - 2x + 1}{x^3 + x^2 - 2x}.$$

How many zeros does this function have? $\boxed{0}$

ZOP5.tex

Exercise 24 *Find the zeros of the following function.*

$$z(x) = 7x(3x-2)(x+8)(x-\sqrt{7})(x+\sqrt{7})$$

Enter the x values from smallest to largest

$$x_1 = \boxed{-8} \quad x_2 = \boxed{-\sqrt{7}} \quad x_3 = \boxed{0} \quad x_4 = \boxed{\frac{2}{3}} \quad x_5 = \boxed{\sqrt{7}}$$

